



Cwm Planning & Design Ltd.

(Civil, Structural & Architectural)

PERCOLATION TEST REPORT

Proposed Residential Development (2 x Detached Dwellings)

On Land to the rear of:

**60 Glyn Road,
Lower Brynamman
Neath Port Talbot**

Date: 29th April 2024

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1.0 BRIEF

Cwm Planning and Design Ltd were instructed to undertake percolation tests for a new residential development consisting of 2 No. detached dwellings on land to the rear of No. 60 Glyn Road, Lower Brynamman.

This would include:

- Monitoring the excavation of the trial pit by mechanical excavator supplied by the client.
- Monitoring the filling and discharge of the trial pit with a water bowser, again supplied by the client.
- To record the discharge timings at specific intervals to ascertain the soil infiltration rate at each of the trial pit locations.
- To produce a report and photographic record of the findings.

2.0 GENERAL INTRODUCTION

The proposal is to construct 2 no. detached residential dwellings on land to the rear of 60 Glyn Road, utilising some of the rear garden space. The site is currently accessed directly off Glyn road but the proposed accesses will be via two new driveways accessed off Maes y Glyn, a classified adopted Road by NPTCBC

The site is fairly modest in area, level throughout with minimal vegetation but laid to marshy amenity grass.



Figure shows site location off Maes y Glyn

3.0 TEST LOCATIONS

3 number trial holes were excavated within the site but only one percolation test was carried out. Given the current site constraints and proposed locations of the dwellings two of the trial holes were located toward the Eastern boundary, where the rear gardens would be positioned, and one trial hole located where the proposed driveways would be positioned.

All three trial pits were excavated approximately 5m away from the location of the proposed dwellings and approx. 3m away from the rear boundaries.

Given the soil conditions in each of the trial holes it was deemed unnecessary to undertake percolation tests in each. The ground was made of up approximately 200mm of good stop soil, then stiff grey clay. The very stiff / dense clay was encountered at approx. 500mm from ground level. One of the trial holes was excavated to a depth of 2.0m with the stiff dense clay still present.

*Reference should be made to the site photographs contained on **Appendix C***



Figure shows location of trial pits

4.0 TESTING PROCEDURES

The test was carried out in accordance with 'BRE 365 soakaway design' in order to establish accurate soil infiltration rates.

All three Trial Pits were excavated with a mechanical excavator and measured 1.0m long, 1.0m wide and approx. 1.0m deep. The sides of the pit were vertical and trimmed, cleaned as much as possible with any loose material removed from the base prior to the filling of water.

The excavation remained stable throughout the duration of the testing procedure and no ground water strikes were encountered.

The trial pit was filled with water bowser to a depth of 500mm and the depth of water taken at 60min intervals over a 24 hour period.

Note: after a 24 hour period the water level reduced by 100mm.

Based upon the testing procedures outlined in 'BRE 365' the trial pits should have been allowed to empty and be filled again three times. The soil infiltration rate could then be calculated from the time taken for the water to drop from 75% to 25% and the lowest value used.

5.0 TEST RESULTS

Over the duration of the testing procedure the water level in TP01 was found to have reduced by only 100mm over the 24 hours.

*Testing data records are contained in **Appendix A***

The results are noted below.

Trail Pit 01: Test 1: 3600 mins (*interpolated from result - (20%/24hrs)*)
 Test 2: --
 Test 3: --
 SOIL INFILTRATION RATE = $579. \times 10^{-9}$ m/s

6.0 CONCLUSIONS

It is concluded that given the results from trial pit testing, the soil infiltration rate is such that a soakaway drainage regime cannot be effectively utilised at the site for the proposed dwellings. ***The soakaway size calculated cannot physically be accommodated on site.***

*The soakaway size / volume is calculated in **Appendix B**.*

Alternative means of water storage & retention should be investigated.

APPENDIX A

PERCOLATION TESTS – DATA RECORDS

* Soil infiltration tests carried out and recorded in strict accordance with 'BRE 365 soakaway design' requirements

APPENDIX B

SOAKAWAY CALCULATIONS

Project 60 Glyn Road, Lower Brynamman				Job no.	
Calcs for SOAKAWAY per dwelling				Start page no./Revision 1	
Calcs by CM	Calcs date 30/04/2024	Checked by	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.05

Design rainfall intensity

Location of catchment area	Swansea
Impermeable area drained to the system	A = 100.0 m ²
Return period	Period = 100 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.360
5-year return period rainfall of 60 minutes duration	M5_60min = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 10 %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = 3000 mm
Width of pit	w = 10000 mm
Length of pit	l = 15000 mm
Percentage free volume	V _{free} = 30 %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l _{trial} = 1000 mm
Width of trial pit	b _{trial} = 1000 mm
Depth of trial pit (below invert)	d _{trial} = 500 mm
Free volume (if fill used)	V _{trial} = 100 %
75% depth of pit	d ₇₅ = (d _{trial} × 0.75) = 375.00 mm
50% depth of pit	d ₅₀ = (d _{trial} × 0.50) = 250.00 mm
25% depth of pit	d ₂₅ = (d _{trial} × 0.25) = 125.00 mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = 3600 min
Test 2 - time to fall from 75% depth to 25% depth	T2 = 3600 min
Test 3 - time to fall from 75% depth to 25% depth	T3 = 3600 min
Longest time to fall from 75% depth to 25% depth	t _g = max(T1, T2, T3) = 3600 min
Storage volume from 75% to 25% depth	V _{p75_25} = (l _{trial} × b _{trial} × (d ₇₅ - d ₂₅)) × V _{trial} = 0.25 m ³
Internal surface area to 50% depth	a _{p50} = ((l _{trial} × b _{trial}) + (l _{trial} + b _{trial}) × 2 × d ₅₀) = 2.00 m ²
Surface area of soakaway to 50% storage depth	A _{s50} = 2 × (l _{trial} + b _{trial}) × d _{trial} / 2 = 1.000 m ²
Soil infiltration rate	f = V _{p75_25} / (a _{p50} × t _g) = 579.×10 ⁻⁹ m/s
Wetted area of pit 50% full	a _{s50} = l × d + w × d = 75000000 mm ²

Table equations

Inflow (cl.3.3.1)	I = M100 × A
Outflow (cl.3.3.2)	O = a _{s50} × f × D
Storage (cl.3.3.3)	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
5	0.36;	7.5;	1.85;	13.9;	1.39;	0.01;	1.38
10	0.51;	10.7;	1.92;	20.5;	2.05;	0.03;	2.02



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Project 60 Glyn Road, Lower Brynamman				Job no.	
Calcs for SOAKAWAY per dwelling				Start page no./Revision 2	
Calcs by CM	Calcs date 30/04/2024	Checked by	Checked date	Approved by	Approved date

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
15	0.62;	13.0;	1.96;	25.4;	2.54;	0.04;	2.50
30	0.79;	16.5;	2.00;	33.1;	3.31;	0.08;	3.23
60	1.00;	20.9;	2.03;	42.4;	4.24;	0.16;	4.08
120	1.22;	25.5;	2.01;	51.1;	5.11;	0.31;	4.80
240	1.48;	30.9;	1.96;	60.7;	6.07;	0.63;	5.45
360	1.67;	34.9;	1.93;	67.4;	6.74;	0.94;	5.80
600	1.90;	39.7;	1.89;	75.1;	7.51;	1.56;	5.95
1440	2.42;	50.6;	1.81;	91.3;	9.13;	3.75;	5.38

Required storage volume

$$S_{\text{req}} = 5.95 \text{ m}^3$$

Soakaway storage volume

$$S_{\text{act}} = l \times d \times w \times V_{\text{free}} = 135.00 \text{ m}^3$$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume

$$t_{s50} = S_{\text{req}} \times 0.5 / (a_{s50} \times f) = 19\text{hr } 2\text{min } 24\text{s}$$

PASS - Soakaway discharge time less than or equal to 24 hours

APPENDIX C

PERCOLATION TESTS – PHOTOGRAPHIC RECORD



Photograph shows ground being broken.



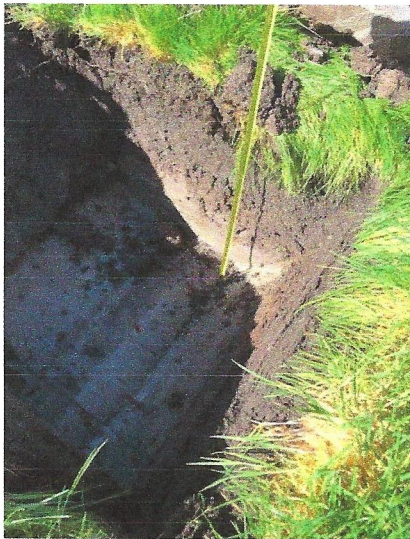
Photograph shows soil type from **TP1**.
(*Typical throughout*)



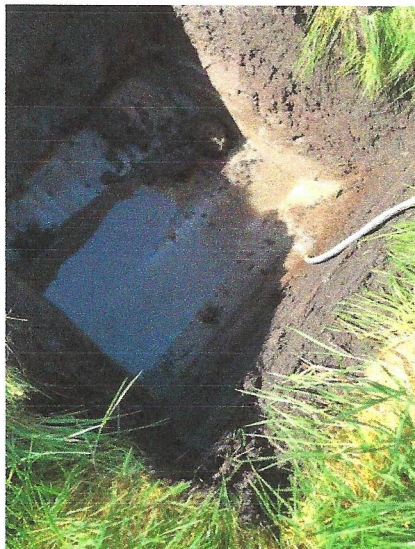
Photograph shows 'slabs' of very stiif, dense
clay excavated from **TP1** (*Typical throughout*).



Photograph shows ground conditions with **TP1** – *(Typical throughout)*.



Photograph shows depth of excavation in **TP1**.



Photograph shows **TP1** being filled with water



Photograph shows depth of TP2.



Photograph shows depth of TP3.



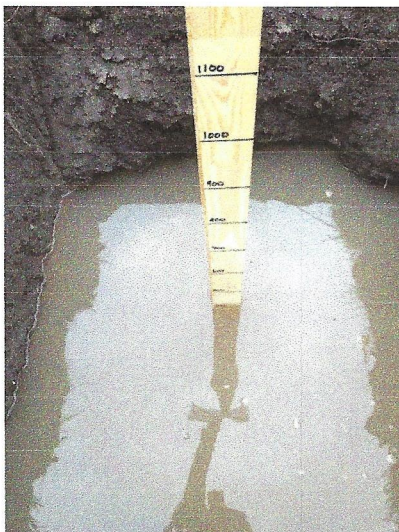
Photograph shows TP1 after water added (500mm)



Photograph shows 500mm water depth.
(start of Test)



Photograph shows TP1 after 24 hours
(400mm water depth)



Photograph shows 400mm water depth.
(End of Test)